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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/494,211	01/25/2000	Il-Ki Woo	003364.P035	3154

7590

02/13/2003

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EXAMINER

DOVE, TRACY MAE

ART UNIT

PAPER NUMBER

1745

16

DATE MAILED: 02/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
**09/494,211**

Applicant(s)  
**Woo**

Examiner  
**Tracy Dove**

Art Unit  
**1745**



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Dec 5, 2002
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 26-28 and 31 is/are allowed.
- 6) ☒ Claim(s) 1-5, 19, 20, 29, and 30 is/are rejected.
- 7) ☒ Claim(s) 6-18 and 21-25 is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☒ Interview Summary (PTO-413) Paper No(s) 11/26/02
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other:

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### **DETAILED ACTION**

This Office Action is in response to the communication filed on 12/5/02. Applicant's arguments have been considered, but are not persuasive. Claims 1-31 are pending. This Action is made **FINAL**.

#### ***Claim Rejections - 35 USC § 112***

The 35 U.S.C. 112, first paragraph, rejection of claim 2 has been withdrawn.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5, 19-20, 29 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada et al., US 5,589,299.

Yamada teaches a negative carbon electrode for a nonaqueous battery comprising a collector with carbon formed thereon (abstract). The battery includes a positive electrode with a lithium transition metal oxide active material (col. 6, lines 56-67), an electrolyte (col. 7, lines 44-67) and a separator (col. 8, lines 10-27). The collector may be formed by a plating process (col.

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5, lines 1-18). The thickness of the collector is in the range 0.1-500  $\mu\text{m}$  (col. 5, lines 27-33).

Yamada teaches that the collector may comprise an alloy of iron-nickel-cobalt plated with copper or an alloy of nickel-copper plated with silver. See col. 3, lines 52-col. 4, lines 25.

Thus the claims are anticipated.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1, 4, 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Idota et al., US 5,686,203.

Idota teaches a nonaqueous lithium battery having a positive electrode active material of a lithium transition-metal oxide (col. 6, lines 23-33), a negative active material of a carbonaceous material (col. 9, lines 45-57), a separator (col. 15, lines 57-61) and an electrolyte (col. 14, lines 17-55). The battery further comprises a positive electrode current collector and a negative electrode current collector. Examples of materials for the negative current collector include stainless steel (Fe-Cr containing), nickel, copper, titanium, aluminum, carbon, silver and

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cadmium with copper and copper alloys being particularly preferred. The thickness of the collector generally ranges from 1-500  $\mu\text{m}$ . See col. 16, lines 12-33.

Idota does not teach any specific examples of the disclosed copper alloy.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Idota teaches and suggests that copper alloys are particularly preferred. One of skill would have known that a copper-silver containing alloy or a copper-stainless steel (Fe-Cr) containing alloy for a negative electrode current collector would have been obvious in view of the teachings of Idota. Idota teaches materials used in negative current collectors and teaches that copper alloys are particularly preferred.

Regarding the process limitation "produced by a plating process", the courts have ruled that in the absence of unexpected results, product-by-process limitations are obvious. In re Fessman.

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Claims 1, 4 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahira et al., US 5,601,950, as evidenced by Idota et al., US 5,686,203..

Yamahira teaches a nonaqueous secondary battery having a positive electrode active material of a lithium transition metal oxide (col. 4, lines 1-7) and a negative electrode material of a carbonaceous material. The negative electrode may include a current collector. Preferably, the current collector comprises copper, nickel, cobalt, iron, chromium, molybdenum, tantalum, tungsten, stainless steel, titanium and mixtures thereof. More preferably, the current collector

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comprises copper, nickel, stainless steel, iron or alloys thereof. See col. 3, lines 25-43. Figure 1 shows a separator 3 and an electrolyte solution is taught in col. 4, lines 15-29.

Yamahira does not explicitly state any particular alloys for the current collector.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because Yamahira teaches it is preferred to have an alloy material comprises at least two materials selected from the group consisting of copper, nickel, stainless steel and iron. Note stainless steel is an alloy of iron containing a high percentage of chromium (see Hawley's Condensed Chemical Dictionary, pages 1092-1093). Thus, one of skill would be motivated to choose copper and stainless steel as the alloy materials of the current collector because both materials are preferred materials and have melting points higher than 1000°C (note Table 1 of Yamahira). Yamahira teaches and suggests a current collector comprising an alloy of copper and stainless steel (iron-chromium).

Regarding the thickness limitation of the negative current collector, Yamahira teaches that the current collector occupies a small area and is preferably in the form of a foil, mesh, expanded metal or punched metal. Thus, Yamahira suggests that the foil has a thickness less than 20 microns because the reference teaches the current collector occupies a small area. Idota teaches that the thickness of the collector generally ranges from 1-500  $\mu\text{m}$ . See col. 16, lines 12-33.

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Regarding the process limitation “produced by a plating process”, the courts have ruled that in the absence of unexpected results, product-by-process limitations are obvious. In re Fessman.

#### *Allowable Subject Matter*

Claims 26-28 and 31 are allowed.

Claims 6-18 and 21-25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art does not teach a lithium battery having a negative current collector of a Cu-based alloy of the instant claims. Specifically, the prior art does not explicitly teach a Cu-based alloy including at least four of the possible alloy constituents listed in the subject claims. There is no motivation in the prior art to pick the at least four alloy components of the instant claims.

Similarly, there is no motivation to pick the recited two (claims 7, 22 and 26) or three components (claims 8 and 23) of the Cu-based alloys of the instant claims.

#### *Response to Arguments*

Applicant's arguments filed 12/5/02 have been fully considered but they are not persuasive.

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Rejection of claims 1 and 3 as being anticipated by Yamada

Applicant argues Yamada teaches various laminate structures, not a current collector with a single alloy material layer. Applicant's submit that plating multiple metals or a laminate structure of multiple elements is not the same as an alloy of multiple metal elements and would not have the same properties. Examiner agrees with Applicant's argument, however, the argument does not reflect the instant claims. Specifically, the claims state "the Cu-based alloy foil comprises at least one material selected from...and further comprises a copper-based material selected from...". This claim language does not exclude a laminate structure. As stated in the Interview Summary Record of 11/26/02, Examiner suggests the claims be amended to state "the Cu-based alloy comprises at least one material selected from...and further comprises a copper-based material selected from..." in order to clearly recite that the Cu-based alloy of the claimed current collector is a single material layer (claims 1 & 3).

Rejection of claims 4, 5, 19, 20, 29 and 30 as being anticipated by Yamada

Applicant provides no specific arguments for claims 4, 5, 19, 20, 29 and 30, therefore, there is nothing for the Examiner to rebut. Note the claims do not recite that the negative current collector "consists" of the Cu-based alloy foil.

Rejection of claims 1, 4 and 19 in view of Idota

Applicant argues that plating or surface modification with multiple metals is not the same as an alloy. While Examiner agrees with this argument, it does not accurately reflect the instant claims or describe the Idota reference. Specifically, the claims do not recite that the negative



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current collector “consists” of the Cu-based alloy foil, and hence, do not exclude plating or surface modification with multiple metals. Furthermore, Idota teaches a negative current collector of copper or a copper alloy is preferred.

Rejection of claims 1, 4 and 19 in view of Yamahira, as evidenced by Idota

Applicant argues Yamahira does not teach or suggest all the claim limitations. However, Yamahira teaches it is preferred to have a negative electrode current collector of an alloy material comprising at least two materials selected from the group consisting of copper, nickel, stainless steel and iron. Note stainless steel is an alloy of iron containing a high percentage of chromium (see Hawley's Condensed Chemical Dictionary, pages 1092-1093). Thus, one of skill would be motivated to choose copper and stainless steel as the alloy materials of the current collector because both materials are preferred materials and have melting points higher than 1000°C (note Table 1 of Yamahira). Yamahira teaches and suggests a current collector comprising an alloy of copper and stainless steel (iron-chromium).

Applicant provides further arguments regarding the carbon mass and binder of the negative electrodes of Yamahira and Idota. Applicant argues Idota teaches against the teachings of Yamahira since Yamahira uses a sintering operation without a binder, while Idota uses alternative methods to produce the electrodes with a binder.

Idota is only cited as an evidence reference and it is important to note that Yamahira suggests the foil has a thickness less than 20 microns (see above argument). Idota is used as a general teaching of the thickness of a negative electrode current collector. Differences in the

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active material composition between Idota and Yamahira do not appear to be relevant. Both Yamahira and Idota teach and suggest a negative electrode current collector comprising a copper alloy with a carbon material applied thereto.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-

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0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).

February 12, 2003

  
**Patrick Ryan**  
**Supervisory Patent Examiner**  
**Technology Center 1700**

## Interview Summary

Application No.  
**09/494,211**

Applicant(s)  
**Woo**

Examiner  
**Tracy Dove**

Art Unit  
**1745**



All participants (applicant, applicant's representative, PTO personnel):

(1) Tracy Dove

(3) \_\_\_\_\_

(2) William Hickman

(4) \_\_\_\_\_

Date of Interview Nov 26, 2002

Type: a) ☒ Telephonic      b) ☐ Video Conference  
c) ☐ Personal [copy is given to 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes      e) ☒ No. If yes, brief description:

Claim(s) discussed: Claim 1

Identification of prior art discussed:

Yamada 5,589,299; Yamahira 5,601,950; Idota 5,686,203

Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments:

Applicant stated Yamada and Idota teach plating layers, not a single alloy material for the collector foil. Examiner suggested amending the claims to recite "...the Cu-alloy comprises at least one..." and "...the copper-based material further comprises a material selected..." to exclude a foil which is not a single material alloy layer. Such an amendment appears to overcome the anticipation rejection in view of Yamada and Idota, however, further consideration will be needed to determine if the claims are obvious in view of Yamada and Idota. The rejection in view of Yamahira has not been overcome. Yamahira suggests the claimed invention. Examiner suggested Applicant might be able to distinguish the instant claims over Yamahira by providing evidence of unexpected results regarding the process limitations.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

i) ☒ It is not necessary for applicant to provide a separate record of the substance of the interview (if box is checked).

Unless the paragraph above has been checked, THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

\_\_\_\_\_  
Examiner's signature, if required